

Amendments to the Claims:

Please cancel claims 23 and 24 without prejudice or disclaimer of the subject matter presented therein. Please amend Claims 1, 18, 19, and 21, and add new Claim 25 as follows.

1. (Currently Amended) A method for producing a composite digital image, comprising the steps of:

providing a plurality of partially overlapping source digital images having pixel values that are linearly or logarithmically related to scene intensity, said source digital images having overlap regions wherein pixels of said source digital images correspond in scene content, said source digital images differing in scene content outside said overlap regions;

determining ~~the~~ a focal length used in a capture of the source digital images from one or more sets of corresponding pixel values of the source digital images in said overlap regions, wherein said determining step comprises optimizing an error measure that includes two radial functions, each of the two radial functions corresponding to a different source digital image, and wherein the error measure is a function of the one or more sets of corresponding pixel values;

computing from the determined focal length, a radial exposure transform to compensate for exposure fall off as a function of the distance of a pixel from the center of the digital image;

modifying the source digital images by applying the radial exposure transform to one or more of the source digital images to produce adjusted source digital images; and

combining the adjusted source digital images to form a composite digital image by blending said overlap regions.

2. (Original) The method of claim 1, further comprising the step of applying a linear exposure transform to one or more of the source digital images prior to combining the adjusted source digital images to produce adjusted source digital images having pixel values that closely match in an overlapping region.

3. (Original) The method claimed in claim 1, wherein the radial exposure transform includes a \cos^4 dependence on the distance from the center of the image.

4. (Previously Presented) The method claimed in claim 1, wherein the step of providing source digital images further comprises the step of applying a metric transform to a source digital image such that the pixel values of the transformed source digital image are linearly or logarithmically related to scene intensity and wherein the metric transform is a scene independent transform.

5. (Cancelled)

6. (Original) The method of claim 1, wherein the combining step includes calculating a weighted average of the pixel values in the overlapping region.

7. (Original) The method of claim 1, further comprising the step of transforming the pixel values of the composite digital image to an output device compatible color space.

8. (Original) The method of claim 4, wherein the metric transform includes a color transformation matrix.

9. (Original) The method of claim 4, wherein the metric transform includes a lookup table.

10. (Original) The method of claim 4, wherein the metric transform is included as metadata with the corresponding source digital image.

11. (Previously Presented) The method of claim 23, wherein the linear exposure transform is a function of the shutter speed used to capture the source digital image, and the shutter speed is included as meta-data with the corresponding source digital image.

12. (Previously Presented) The method of claim 23, wherein the linear exposure transform is a function of the f-number used to capture the source digital image and the f-number is included as meta-data with the corresponding source digital image.

13. (Original) The method of claim 1, wherein the radial transform is included as metadata with the corresponding source digital image.

14. (Cancelled)

15. (Original) The method claimed in claim 1, wherein a use of flash indicator is employed to calculate the radial transform for each digital image.

16. (Cancelled)

17. (Previously Presented) A computer program product comprising computer readable storage medium having a computer program stored thereon for performing the method of claim 1.

18. (Currently Amended) A method for producing a composite digital image, comprising the steps of:

providing a plurality of partially overlapping source digital images having pixel values that are linearly or logarithmically related to scene intensity, said source digital images having overlap regions wherein pixels of said source digital images correspond in scene content, said source digital images differing in scene content outside said overlap regions;

determining ~~the~~ a focal length used in a capture of the source digital images based upon one or more sets of corresponding pixel values of the source digital images in said overlap regions;

computing from the determined focal length, a radial exposure transform to compensate for exposure fall off as a function of the distance of a pixel from the center of the digital image;

modifying the source digital images by applying the radial exposure transform to one or more of the source digital images to produce adjusted source digital images; and

combining the adjusted source digital images to form a composite digital image by blending said overlap regions;

wherein said determining further comprises identifying the root of the function:

$$g(f) = I_i'' \cos^4 \left(\tan^{-1} \left(f^{-1} \sqrt{u_i^2 + v_i^2} \right) \right) - I_i' \cos^4 \left(\tan^{-1} \left(f^{-1} \sqrt{x_i^2 + y_i^2} \right) \right)$$

wherein I_i'' and I_i' are exposure values at points in the digital images at the overlapping region; u_i and v_i , and x_i and y_i , are pixel positions in the respective digital images, and f is the focal length.

19. (Currently Amended) A system for producing a composite digital image, comprising:

means for providing a plurality of partially overlapping source digital images having pixel values that are linearly or logarithmically related to scene intensity, said source digital images having overlap regions wherein pixels of said source digital images correspond in scene content, said source digital images differing in scene content outside said overlap regions;

means for determining ~~the~~ a focal length used in a capture of the source digital images from one or more sets of corresponding pixel values of the source digital images in said overlap regions, wherein the means for determining determines the focal length at least by optimizing an error measure that includes two radial functions includes two radial functions, each of the two radial functions corresponding to a different source digital image, and wherein the error measure is a function of the one or more sets of corresponding pixel values;

means for computing from the determined focal length, a radial exposure transform to compensate for exposure fall off as a function of the distance of a pixel from the center of the digital image;

means for modifying the source digital images by applying the radial exposure transform to one or more of the source digital images to produce adjusted source digital images; and

means for combining the adjusted source digital images to form a composite digital image by blending said overlap regions.

20. (Previously Presented) The system of claim 19 further comprising means for applying a linear exposure transform to one or more of the source digital images prior to combining the adjusted source digital images to produce adjusted source digital images having pixel values that closely match in an overlapping region.

21. (Currently Amended) A system for producing a composite digital image, comprising:

means for providing a plurality of partially overlapping source digital images having pixel values that are linearly or logarithmically related to scene intensity, said source digital images having overlap regions wherein pixels of said source digital images correspond in scene content, said source digital images differing in scene content outside said overlap regions;

means for determining ~~the~~ a focal length used in a capture of the source digital images based upon one or more sets of corresponding pixel values of the source digital images in said overlap regions;

means for computing from the determined focal length, a radial exposure transform to compensate for exposure fall off as a function of the distance of a pixel from the center of the digital image;

means for modifying the source digital images by applying the radial exposure transform to one or more of the source digital images to produce adjusted source digital images; and

means for combining the adjusted source digital images to form a composite digital image by blending said overlap regions;

wherein said means for determining further comprises means for identifying the root of the function:

$$g(f) = I_i'' \cos^4 \left(\tan^{-1} \left(f^{-1} \sqrt{u_i^2 + v_i^2} \right) \right) - I_i' \cos^4 \left(\tan^{-1} \left(f^{-1} \sqrt{x_i^2 + y_i^2} \right) \right)$$

wherein I_i'' and I_i' are exposure values at points in the digital images at the overlapping region; u_i and v_i , and x_i and y_i , are pixel positions in the respective digital images, and f is the focal length.

22. (Previously Presented) The method of claim 1 wherein said determining further comprises analyzing the exposure falloff in at least one of said overlap regions.

23-24 (Cancelled)

25. (New) A method for determining a focal length used in a capture of a plurality of partially overlapping source digital images, the method comprising the steps of:

providing the plurality of partially overlapping source digital images, said source digital images having overlap regions wherein pixels of said source digital images correspond in scene content, said source digital images differing in scene content outside said overlap regions;

determining the focal length used in the capture of the source digital images from one or more sets of corresponding pixel values of the source digital images in said overlap regions, wherein said determining step comprises optimizing an error measure that includes two radial functions, each of the two radial functions corresponding to a different source digital image, and wherein the error measure is a function of the one or more sets of corresponding pixel values; and

storing the focal length in a computer readable storage medium.